Effect of boron application on herbage and seed yields of subterranean clover

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Boron deficiency has been reported in pastures (1) and in some crops (2) on the Tablelands of N.S.W. Lucerne is thought to be particularly sensitive, but subterranean clover has also responded to a small extent (8-16%). However, there is little recent information on B status in relation to clover, and none on the effect of B deficiency on seed production, although this would directly affect persistence in the pasture. Moreover, there appears recently to have been a decline in the clover component of pastures, which may reflect a decrease in seed set. Seed yield in relation to B supply was therefore studied.

Materials and Methods

Two acid duplex soils developed on granite near Tarago and Berridale, N.S.W., were sampled at 0-5 and 5-10cm. Each was sieved and placed in its layers in 6 boxes, each 29cm x 38cm x 12cm deep, lined with polyethylene. Basal Ca, P, S, K, Mo, Cu, Zn and Co were applied after removing the top 3cm of soil. The first two were given as powders (gypsum and monocalcium phosphate), the rest in solution. Pre-germinated, uninoculated seed of subterranean clover cv. Daliak was sown on a 5cm x 5cm grid pattern. After emergence, 3 boxes of each soil received B in solution at 0.6 kg/ha (April 30). The plants were grown in an unheated glasshouse, with watering to weight (80% field capacity) whenever they approached wilting. Water distilled from stainless steel was given. On June 15, July 27 and August 30, light defoliations were made to reduce shading and the rate of spread, though without removing any runners. The final harvest of total tops was on December 3 after seed maturation. Plant material was dried at 80?G. The above-ground burrs were separated and threshed for aerial seed; buried seed was recovered from the upper 5cm of soil by pulverising, sieving and hand cleaning. Soil and plant boron contents were determined.

Results and Discussion

The results are summarised in Table 1. At the early, partial harvests, there was some small response to B (Tarago) but the final herbage yield was lower following application of B than without. Seed yields, however, were strongly increased by B, particularly on the soil from Tarago.

Table 1. Yields of herbage and seed from subclover grown on boxes of 2 soils, with and without applied boron. (Letters shown response to B: P = 0.05).

		Herbage (g)			Seed (g)			Combined (g)	
		Early	Final	Total (1)	Aerial (2)	Buried	Total (3)	(1)+(2)	(1)+(3)
Tarago	B_0	18.7a	37.9a	56.6a	0.9a	2.6a	3.5a	57.4a	60.0a
	B_1	26.3b	29.8a	56.1a	2.4b	19.1b	21.5b	58.5a	77.7b
Berridale	B_0	35.1b	70.3b	105.4b	4.5a	9.7a	14.2a	109.9b	119.6a
	B_1	37.1a	45.9a	83.0a	3.9a	30.0b	33.9b	86.9a	116.9a

That is, seed and herbage provide different assessments of B status. Since previous workers measured only above-ground yields they may have missed the expression of B deficiency in seed yields: unrecognised B deficiency may be reducing seed production and hence the density of clover in pastures.

1. Anderson, A.J. 1952. J. Aust. Inst. Agric. Sci., 18 : 159-162.

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